Functions

* Domain →

Set of inputs (also called pre-image) is called domain.

* Co-domain →

Set of possible outputs is called co-domain

* Range →

Set of actual outputs is called range or it is denoted by R_f.

→ $R_f \subseteq$ codomain.

* Function →

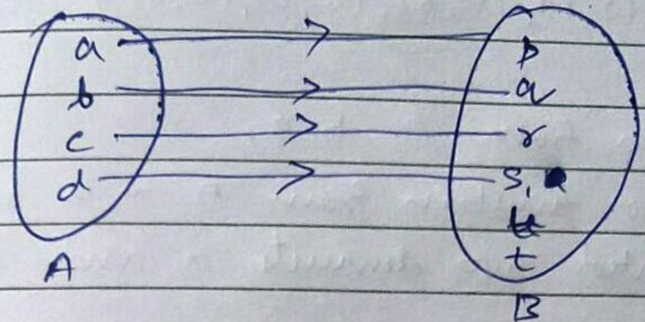
If A and B are two non-empty sets then a rule f under which to every element x of the set A there corresponds one and only one elements of set B then the rule f is called the function from A to B.
It is denoted by $f: A \to B$.
If a pre-image is denoted by x and an image is denoted by y then we can write $y = f(x)$ where $y \in B$ and $x \in A$ and $f(x)$ is called the value of the function.

* एक element के images नहीं हो सकती हैं। और ऐसा लिखा हो तो Function नहीं होगा।

* Methods of representing a function –

(a) Arrow diagram –

$f : A \to B$



(Domain) $D_f = \{a, b, c, d\}$

co-domain $= \{p, q, r, s, t, u\}$

and $f(a) = p,\ f(b) = q,\ f(c) = r,\ f(d) = s$

(b) Tabular form –

$f : A \to B$

$y = f(x) = x^2$

A →	x	1	2	3	4	5
B →	$y = f(x)$	a	b	c	d	e
		1	4	9	16	25

→ Domain

→ Co-domain

Domain $(D_f) = \{1, 2, 3, 4, 5\}$

Co-domain $= \{a, b, c, d, e\}$

* Difference between function and relation -

(Ex) Let $A = \{1, 2, 3, 4, 5\}$, $B = \{a, b, c\}$

If $R = \{(1,a), (2,b), (3,b), (4,c), (5,c)\}$

& $S = \{(1,a), (2,c), (1,b), (4,c), (5,c)\}$

Here,

S is a relation from A to B,

but S is not a function from A to B because $1 \in A$ is associated two elements a and b of B.

* Kinds of function (or mapping) -

(1) Into mapping -

If the function from $f: A \to B$ be a mapping such that at least one element of B is not a f image of any element of the set A then the mapping f is said to be an into mapping or (A into B) mapping.

Symbollically the above definition can be given as follows →

A mapping $f: A \to B$ is said to be into mapping if $\{f(x) : x \in A\} \subset B$.

ex -